Space Weather Forecast

Issued on Thursday, 05 September 2024 at 00:06 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares expected, slight chance of Strong flares. Chance of S1/Minor Radiation Storms through the period.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been Moderate in the past 24hrs, with several Moderate flares. The strongest was an M1.4 peaking at 04/0255 UTC from un unnumbered region in the southeast quadrant. There are currently nine sunspot regions on the visible disc, three of which are sufficiently large and complex enough to be of interest for the forecast period. The largest and most complex region is in the southwest quadrant. There is another large region susceptible to produce significant flares. It has maintained its magnetic complexity but is approaching the southwest limb and will soon rotate off the visible disc. The final large region is in the southeast quadrant. It has been responsible for much of the Moderate flare activity and continues to show significant looping in imagery, probably magnetically connected to another region close to it on the southeast limb. All other regions are relatively simple and stable at present.

No Earth-directed Coronal Mass Ejections (CME) were observed in satellite imagery in the last 24 hours. A very faint signal was observed lifting off the southwest limb at around 04/1600 UTC but preliminary analysis revealed that this is most likely far-sided and slow. No obvious source was identified.

Solar Wind / Geomagnetic Activity: Solar wind parameters were indicative of a CME Arrival at around 04/0940 UTC. The solar wind speed rose sharply from 330 km/s to 410 km/s then 440 km/s later The Interplanetary Magnetic Field was moderate but became suddenly strong, and so did the important north-south component, Bz. The solar wind speed is now declining, along with a below average density and a moderate IMF, indicating the end of the magnetic cloud and a gradual return to a slow wind regime. Resulting geomagnetic activity was Quiet to Active (Kp 1-4) but with a provisitional G1 Minor Storm interval between1200-1500 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has finally levelled off following the rise in response to a flare on 01 Sep. It remains below the S1/Minor Radiation Storm level.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is expected with a slight chance of isolated Strong flares. The main flare risk is currently from any of the three larger sunspot regions in the southern hemisphere.

Solar Wind / Geomagnetic Activity: The recent uptick in geomagnetic activity and solar wind speeds has been attributed to glancing effects from a large CME off the southeast limb on 01 Sep, the bulk of which was expected to pass well behind Earth's orbit. The solar wind speed is now declining, along with a moderate IMF, indicating the end of the magnetic cloud and a

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gradual return to a slow wind regime. Two coronal holes are currently present on the western hemisphere, CH67/- and CH/65/+. The HSS associated with the positive coronal hole may enhance wind speeds to 450-500km/s on Day 3 (07 Sep).

Geomagnetic activity is expected to be mainly Quiet to Unsettled (Kp 1-3) through this period.
Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is currently above background levels, but below the S1/Minor Radiation Storm threshold. There is a chance of exceeding S1 in the coming days.

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Met Office Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	70	70	80
Very Active	R3 to R5 X	No	25	20	20	25

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	25	25	25	25
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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